Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

Claim 1 (currently amended): An image reproducing and forming apparatus comprising:

an ejection head configured to eject a liquid droplet from a nozzle to form an image on a medium;

a driving signal generating unit configured to generate a driving waveform that includes an ejecting pulse for causing the liquid droplet to be ejected from the nozzle and another pulse, and to select a desired waveform from the driving waveform to produce a driving signal, the driving signal generating unit being further configured to produce a non-ejecting pulse making use of two or more different portions of the driving waveform, the non-ejecting pulse having a pulse width greater than that of the ejecting pulse, while producing energy for not ejecting the droplet; and

a driving unit configured to drive the ejection head based on the driving signal supplied from the driving signal generating unit,

wherein at least one of the two or more different portions of the driving waveform is a portion of an ejecting pulse, and the non-ejecting pulse generated by said driving signal generating unit using the two or more different portions of the driving waveform has a pulse width greater than that of the ejecting pulse and has a smaller electric potential difference than that of the ejecting pulse.

Claim 2 (currently amended): An image reproducing and forming apparatus

comprising:

an ejection head configured to eject a liquid droplet from a nozzle to form an image on a medium;

a driving signal generating unit configured to generate a driving waveform that includes an ejecting pulse for causing the liquid droplet to be ejected from the nozzle and another pulse, and to select a desired waveform from the driving waveform to produce a driving signal, the driving signal generating unit being further configured to produce a non-ejecting pulse making use of at least two different portions of the driving waveform, the non-ejecting pulse producing energy for not ejecting the droplet; and

a driving unit configured to drive the ejection head based on the driving signal supplied from the driving signal generating unit,

wherein the driving waveform includes first and second dummy pulses, and the driving signal generating unit produces the non-ejecting pulse making use of a portion of the first dummy pulse and a portion of the second dummy pulse, and

wherein at least one of the two or more different portions of the driving waveform is a portion of an ejecting pulse, and the non-ejecting pulse generated by said driving signal generating unit using the two or more different portions of the driving waveform has a pulse width greater than that of the ejecting pulse and has a smaller electric potential difference than that of the ejecting pulse.

Claim 3 (currently amended): An image reproducing and forming apparatus comprising:

an ejection head configured to eject a liquid droplet from a nozzle to form an

image on a medium;

a driving signal generating unit configured to generate a driving waveform that includes an ejecting pulse for causing the liquid droplet to be ejected from the nozzle and another pulse, and to select a desired waveform from the driving waveform to produce a driving signal, the driving signal generating unit being further configured to produce a non-ejecting pulse making use of different portions of the driving waveform, the non-ejecting pulse producing energy for not ejecting the droplet; and

a driving unit configured to drive the ejection head based on the driving signal supplied from the driving signal generating unit,

wherein the driving waveform includes a dummy pulse and the driving signal generating unit produces the non-ejecting pulse, making use of a portion of the dummy pulse and a portion of the ejecting pulse, and

wherein at least one of the two or more different portions of the driving waveform is a portion of an ejecting pulse, and the non-ejecting pulse generated by said driving signal generating unit using the two or more different portions of the driving waveform has a pulse width greater than that of the ejecting pulse and has a smaller electric potential difference than that of the ejecting pulse.

Claim 4 (previously presented): The image reproducing and forming apparatus of claim 1, wherein the driving signal generating unit produces the non-ejecting pulse that draws in a meniscus of the nozzle.

Claim 5 (previously presented): The image reproducing and forming apparatus of

claim 1, wherein signal generating unit produces the non-ejecting pulse that pushes out a meniscus of the nozzle and has a pulse width smaller than a period of pressure-induced resonance in a liquid chamber of the ejection head.

Claim 6 (previously presented): The image reproducing and forming apparatus of claim 1, wherein the non-ejecting pulse has a falling edge with a first rate of voltage change and a rising edge with a second rate of voltage change that is smaller than the first rate of voltage change.

Claim 7 (previously presented): The image reproducing and forming apparatus of claim 1, wherein the non-ejecting pulse includes a first portion that draws in a meniscus of the nozzle with a first rate of voltage change and a second portion that restores the meniscus of the nozzle with a second rate of voltage change smaller than the first rate of voltage change.

Claim 8 (previously presented): The image reproducing and forming apparatus of claim 1, wherein the non-ejecting pulse includes a first waveform that pushes out a meniscus of the nozzle and a second waveform that follows the first waveform to draw in the meniscus of the nozzle, the first waveform having a pulse width smaller than a resonant frequency of a liquid chamber of the ejection head.

Claim 9 (previously presented): The image reproducing and forming apparatus of claim 1, wherein the driving signal includes a first non-ejecting signal inserted at a

beginning of the driving signal and a second non-ejecting signal inserted at an end of the driving signal.

Claim 10 (previously presented): The image reproducing and forming apparatus of claim 1, wherein the ejection head includes an actuator for producing a pressure to eject the droplet, and the driving signal including the non-ejecting pulse is applied to the actuator.

Claim 11 (previously presented): The image reproducing and forming apparatus of claim 2, wherein the driving signal generating unit produces the non-ejecting pulse that draws in a meniscus of the nozzle.

Claim 12 (previously presented): The image reproducing and forming apparatus of claim 2, wherein signal generating unit produces the non-ejecting pulse that pushes out a meniscus of the nozzle and has a pulse width smaller than a period of pressure-induced resonance in a liquid chamber of the ejection head.

Claim 13 (previously presented): The image reproducing and forming apparatus of claim 2, wherein the non-ejecting pulse has a falling edge with a first rate of voltage change and a rising edge with a second rate of voltage change that is smaller than the first rate of voltage change.

Claim 14 (previously presented): The image reproducing and forming apparatus of

claim 2, wherein the non-ejecting pulse includes a first portion that draws in a meniscus of the nozzle with a first rate of voltage change and a second portion that restores the meniscus of the nozzle with a second rate of voltage change smaller than the first rate of voltage change.

Claim 15 (previously presented): The image reproducing and forming apparatus of claim 2, wherein the non-ejecting pulse includes a first waveform that pushes out a meniscus of the nozzle and a second waveform that follows the first waveform to draw in the meniscus of the nozzle, the first waveform having a pulse width smaller than a resonant frequency of a liquid chamber of the ejection head.

Claim 16 (previously presented): The image reproducing and forming apparatus of claim 2, wherein the driving signal includes a first non-ejecting signal inserted at a beginning of the driving signal and a second non-ejecting signal inserted at an end of the driving signal.

Claim 17 (previously presented): The image reproducing and forming apparatus of claim 2, wherein the ejection head includes an actuator for producing a pressure to eject the droplet, and the driving signal including the non-ejecting pulse is applied to the actuator.